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acquired two chromosomes (in the unreduced nucleus) in the course of domestication.

EDUCATION OF INFUSORIA IN INGESTION OF FOOD

Metelnikow (C. R. Soc. Biol., Paris, 1913, pp. 701-704) states that infusoria may be brought to use more selection in the taking of substances. By using substances only slightly injurious or even substances with no nutritive qualities, he found such substances would be taken indiscriminately at first; but after a period of hours or days they cease to take them in. Such substances, at first taken freely and later refused, were aluminium in emulsion, sudan red, phosphorus, sepia, and carmine. In some instances the presence of another substance would induce them to swallow particles which they had learned to refuse. For example, they would take a mixture of sepia and carmine when they refused carmine alone.

SPIROSTYLE IN SPERMATOOA

Champy (C. R. Soc. Biol., Paris, 1913, pp. 663-4) makes a comparative study and an interpretation of the spiral, rod-like body found in many spermatozoa. He suggests axostyle and spirostyle as its name. He finds it in several amphibians; it has also been described in some reptiles, birds and mammals. He traces the development in amphibian from a simple axial rod in the nuclei of the spermatids to a twisted spiral one in the early stages of sperm formation, and finally to its partial or total disappearance in mature sperm. Its twisting in development involves both the nucleus and the cytoplasm, and thus may give a definite torsion to the whole spermatozoan. The result in the motion of the sperm is to produce a spiral course such as we see in many of the protozoa.

NERVE FIBRILS IN DENTINE

Contrary to the usual interpretation, Mummery (Proc. Roy Soc., Ser. B., 1912, p. 79) holds that the dentine of the teeth is innervated clear to its outer edge by nerve fibrils from the pulp cavity. There is a plexus over the outer surface of the pulp, and from this the neurofibrils, usually two to each tubule, enter the

dentine tubules and run their whole length to the point where the enamel or cement joins. This enables us better to understand the power of the dentist over us.

SUCCESION IN FUNGI

Brown and Graff (Phil. Jour. Sci., VIII, Sec. C. I; 1913, p. 21) report studies on the succession of fungi growing on dung. This is a class of studies always of value to directors of laboratories, and more of such should be made. The authors' record that the moulds, as the *Mucors*, first appeared, followed by *Oospora*. These disappeared in about 10 days. Next appeared the sporophores of species of *Coprinus*, which persist for a long time. The authors believe the order of appearance is due to different periods of latency and rates of development of the spores of the species; and that the poor persistence of the early types were due to hurtful micro-organisms or to toxins formed in the dung about the fungi. Experiment showed that the *Mucors* were not short-lived on sterilized materials.

RUSTS AND THEIR HOST TISSUES

Tischler (Flora 104, 1911; Bot. Gaz., Aug., 1913) describes the relation between *Uromyces Pisi* and *Euphorbia Cyparissias*, its host in the æcidial stage. The rust winters in the buds of the subterranean shoots, and as these grow it tends to keep pace with them. If the parasite thrives the host is deformed in a characteristic way. The author investigated the following among other questions. Under what conditions do the shoots of the host outgrow, and escape as it were, the ill effects of the parasite? Along what routes do the hyphae of the rust run in keeping pace with the new growth? Just at what time in the cell history do the hyphae change the cell so as to produce the deformed growths?

It was found that the shoots might grow away from the fungus by furnishing high temperature and other conditions which would force the growth of the host. Also when the rust approaches its fruiting stage the host may outgrow it. If kept in the dark so that æcidia do not form, the buds cannot grow away from the rust.

The hyphae of the rust do not succeed in sending haustoria into the meristematic cells, and hence the deformation is not due to